

TRANSCRIPT

The Secret Life of Fat, with Michele La Merrill

[THEME MUSIC]

AHEARN: It's *The Researcher's Perspective*. I'm Ashley Ahearn.

People spend a lot of time and money trying to get rid of adipose tissue.

That's right, fat.

Many see it as lumpy extra baggage that gets in the way of everything from a sprint workout to a favorite outfit.

But adipose tissue serves several important functions in the body. It helps us store energy and endocrine hormones that can affect behavior, energy regulation, immune and vascular function—to name a few.

And here's another benefit: Adipose tissue protects against the toxic effects of persistent organic pollutants [POPs].

That's the topic of a review published in *EHP* by Michele La Merrill and colleagues.¹

La Merrill is an assistant professor in the Department of Environmental Toxicology at the University of California, Davis. She joins me now by phone.

Hi, Michele.

LA MERRILL: Hi, Ashley.

AHEARN: First of all, when it comes to persistent organic pollutants, Michele, how do these chemicals interact with fat tissue?

LA MERRILL: Many of the POPs are very fat soluble, which means when they get into your body they go to the fat tissue, and so storing POPs in fat tissue keeps them from exposing your other body tissues and organs to high levels of these persistent organic pollutants. So, the dioxins, the PCBs, the flame retardants, the organochlorine pesticides—many of the persistent organic pollutants are immunotoxicants and cause liver damage and can cause certain types of cancers. And so we think that by storing most of the POPs in the fat tissue, it's keeping them from places like the liver and your lymph nodes so that the POPs can do less damage in those places.

And one of the interesting things that we discussed in our paper is that when the POPs are in your body they seem to actually be increasing your risk for high lipids such as high blood cholesterol and also an increased risk of obesity.

AHEARN: So I wonder, for people who are obese is there a cycle at play here? I'm thinking the more POPs you have in your body, the more likely you are to form the fat tissue, and then that fat tissue, the more you have of it, the more POPs will collect there, and it sort of feeds on itself. Does that make sense?

LA MERRILL: It is a great concern of mine, actually. We do know that the more fat you have, the longer it ultimately takes your body to eliminate many of the POPs that get stored in that fat, and we have seen evidence that many of the POPs that we have looked at seem to increase your risk for obesity, and so taken together you can imagine that having POPs in your body makes you accumulate more fat, and having more fat makes it harder for you to get rid of the POPs.

AHEARN: So for people who lose a lot of weight, say they have bariatric surgery, what happens to those POPs?

LA MERRILL: Losing weight is a really dynamic process in terms of what happens to your fat *and* what happens to your POPs. So, when fat is burned during weight loss, because those POPs are so closely associated with the fat itself, the POPs are actually released into the bloodstream.

This is similar to shaking a bottle of olive oil and vinegar salad dressing where at first the oil goes into the vinegar side, and you can see little oil droplets in the vinegar, and then they go quickly back to the oil side. You can imagine those little oil droplets that briefly went to the vinegar—they're the same as the POPs going into the blood briefly and then going back into the fat tissue.

AHEARN: But this isn't to say that you're advising people not to lose weight because you'll release these POPs into the body.

LA MERRILL: Absolutely not. We know for sure that losing weight has a lot of benefits including reducing your risks for cardiovascular disease and some types of cancer, and some of the POPs will actually be eliminated and excreted from your body due to the weight loss. We saw a 10–15% reduction in the total amount of PCBs in the body one year after bariatric surgery.²

AHEARN: Michele, why did you feel you needed to write this review?

LA MERRILL: Well, we thought for a long time that fat tissue was primarily there to help us store extra calories and to help us store the extra POPs, and we've in recent years become very aware of the active metabolic role that fat tissue has in maintaining a healthy metabolism. And with it we've come to understand that these very same POPs that we thought were there to protect us from toxicity elsewhere might be causing toxicity

to the fat tissue themselves. We wanted to write this paper to acknowledge that we have an increased understanding not only of the importance of adipose tissue biology but the interaction between that adipose tissue and the POPs beyond the storage of the POPs in the fat tissue.

AHEARN: So, what further research needs to happen? What other questions remain for you about this relationship between POPs and fat tissue?

LA MERRILL: We've seen a number of studies that POPs are able to increase our cholesterol and fat tissue, but these studies have just begun to emerge, and we need more studies to help us understand the mechanism of how POPs could increase obesity and blood lipids such as cholesterol in order to understand how we might prevent this from happening.

AHEARN: And so as more and more people consider undergoing bariatric surgery to fight the obesity epidemic in this country, your research could potentially be very valuable in terms of assessing the risks along the way.

LA MERRILL: Yes, thank you. I think that many people are considering bariatric surgery in the treatment of their obesity because it's proven to be quite effective so far. We've seen studies showing that it reduces the fat mass by nearly half. It also seems to reduce your risk for cardiovascular disease and some cancers, which are very real and positive benefits. There aren't very many studies right now looking at what happens to POPs during and after bariatric surgery. Because that surgery is becoming more and more common, it's an important area of research to look further at what happens to POPs before and after bariatric surgery so that we can better prevent any toxicities that may occur to people due to that bariatric surgery.

For instance, one study showed that after bariatric surgery even though everybody who had bariatric surgery had a reduction in their high blood lipids, we saw a less dramatic reduction in those blood lipids, such as cholesterol, if those people also had a high body burden of these POPs.²

AHEARN: And for the general population, what advice do you have for people who want to minimize their exposure to POPs in the first place?

LA MERRILL: The good news is most of the POPs we discussed such as dioxins and PCBs, flame retardants, organochlorine pesticides, they're either being voluntarily phased out, have already been phased out, or are banned.³ [But] what this means is that they are lingering in the food chain, and one of the ways that you can prevent your exposure to these POPs is by reducing your intake of animal fats, either through a vegan diet or less dramatically by choosing to eat less animal fats in your diet. An important thing to consider is one of the POPs we looked at that seems to increase risk for obesity and high cholesterol is the brominated flame retardant class of POPs, and these POPs are found in furniture and electronics that keep us safe from fires, and we know that they end up in

your environment as house dust, and one of the things you can do to prevent that exposure is by dusting regularly and vacuuming regularly.

AHEARN: Well, we know we're supposed to be doing that anyway already [laughs]. Michele, thanks so much for joining me.

LA MERRILL: Thank you, Ashley.

AHEARN: Michele La Merrill is an assistant professor in the Department of Environmental Toxicology at the University of California, Davis.

And that's *The Researcher's Perspective*. I'm Ashley Ahearn. Thanks for downloading!

[THEME MUSIC FADES UP]

Suggested citation: Ahearn A. The secret life of fat, with Michele La Merrill [podcast]. Environ Health Perspect (1 Jan 2013); <http://dx.doi.org/10.1289/ehp.trp010113>.

The Researcher's Perspective is a product of *Environmental Health Perspectives (EHP)*, a monthly journal of peer-reviewed research and news published with support from the National Institute of Environmental Health Sciences, National Institutes of Health, U.S. Department of Health and Human Services. Views and opinions expressed in this podcast are those of the interview subject and do not necessarily reflect the views, opinions, or policies of *EHP* or of the National Institute of Environmental Health Sciences.

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² Kim MJ, et al. Fate and complex pathogenic effects of dioxins and polychlorinated biphenyls in obese subjects before and after drastic weight loss. Environ Health Perspect 119(3):377–383 (2011); <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3060002/>.

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